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Reduction of operational message traffic: development of a composite reporting system

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REDUCTION OF OPERATIONAL MESSAGE TRAFFIC: DEVELOPMENT OF A COMPOSITE REPORTING SYSTEM

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THESIS

REDUCTION OF OPERATIONAL MESSAGE TRAFFIC:

DEVELOPMENT OF A COMPOSITE REPORTING SYSTEM

by

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Reduction of Operational Message Traffic:

Development of a Composite Reporting System

by

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ABSTRACT

The problems encountered by operational units of the U.S. Navy in meeting the requirements to submit a multitude of reports ranging from simple Fuel Status Reports to rigidly defined, computer formatted Movement Reports are almost overwhelming. The evolution of these requirements and recent attempts to simplify reporting are reviewed. A proposal is presented which outlines the development, test, and evaluation, and a gradual integration of a Composite Reporting System into the existing communications system. This Composite Reporting System is the logical predecessor of a Navy-wide Information System.

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I. INTRODUCTION

In my experience as a communications officer, navigator, electronics officer, and operations officer, I have never felt confident that I had properly drafted and addressed all of the reports in my area of responsibility whenever an "extraordinary" situation had developed. In discussing this problem with several other officers, from Captain through Ensign, I find that this feeling persists at all levels. To my knowledge, there is no complete list of such required reports available. Each unit must research many publications, operation orders, instructions, letters of instruction, and message files in order to fulfill the reporting requirements for each incident. Many of the reports generated as a result of an "extraordinary" situation contain redundant information. It might seem reasonable to attempt to identify all of the current required reports, the units responsible for their origination, the addressees to whom they must be submitted, and the information contained in each type. It would then be possible to determine the amount of redundancy and propose the elimination, revision or combination of these required reports in order to arrive at a concise listing of all required reports, the criteria for origination of these reports, the format of these reports and the addressees to whom these reports should be sent, and to make this available to the operational units of the fleet.

This undertaking would prove to be a considerable task. Each operational unit has a unique suit of reference publications, and depending upon the task and mission assignment, geographical location and a multitude of other variables, each would be required to utilize a different set of reports and addressees to cover an identical incident. Even in

such routine reporting situations as equipment failure, movement or weather observation, investigations aboard operating units revelaed that those personnel responsible for generation of a report could not readily substantiate:

a. Who required the report.

b. What criteria justified a report.

c. To whom must the report be sent.

d. How often must the report be updated.

e. What format must be used.

When these personnel of the operating units of the fleet were asked, "How do you know that a particular report is required," the replies were of the nature ... "We have always submitted that report.", "The man I relieved told me to be sure and send that report.", "The last time a similar situation occurred, we made this report and nobody criticized it." ... etc. But no one I spoke with could state with absolute certainty that he had not missed sending some obscure report which was required by one of his publications.

Instead of trying to identify and analyze all of the currently effective operational reports in an attempt to reduce or eliminate redundancy, I chose an alternate way to approach the ever-increasing problems in reporting. That approach was examining the feasibility of an information system in which the operational units of the fleet could submit simple reports on any situation, routine or unusual, and be sure that this information was disseminated to the proper authority.

A scenario is used in Section 2 to illustrate the problems encountered by operational units in complying with existing reporting requirements. A brief history of the evolution of the present reporting system

is presented in Section 3, followed in Section 4 by a review of recent attempts to formulate a Composite Reporting System. An attempt is made in Section 5 to illustrate the flexibility of such a concept by adding a previously excluded report to an experimental Composite Reporting System. Section 6 deals with the proposal of how a workable Composite Reporting System could be developed, tested and integrated into the present reporting system, and Section 7 is a summary.

II. OVERVIEW OF THE PROBLEM

A. ONE INCIDENT

Suppose that you are the Commanding Officer of the USS Destroyer enroute from San Diego to Pearl Harbor. At 0200 you are awakened from a deep sleep by the Officer of the Deck who makes the following report.

"Sorry to wake you Captain, but there has been a casualty to Number 3 boiler. We have lost all electrical power, are dead in the water, fireman Jones was injured and taken to sickbay, and the chief engineer says it will be at least an hour before he can get up steam in Number 1 boiler." You reply, "Very well. Have the chief engineer report to my cabin with an assessment of the damage as soon as he has made a preliminary investigation."

At 0230 the chief engineer arrives and the following facts are revealed:

1. The casuality was caused by high water in the boiler.
2. Water was carried over the steam lines to the generator and the main turbine.
3. Fireman Jones, in his haste to wrap up the boiler, fell off a a ladder and has suffered a broken arm.
4. The emergency generator will not start. Estimated time to restore electrical power is about 30 minutes.
5. Number 1 boiler will be on the line ready to answer bells in approximately an hour.

In the meantime, the operations officer appears and reports that due to the surge of power at the time of the casuality, the surface search radar is down along with several pieces of communications equipment. And of course the Fleet Broadcast cannot be relieved until power has been restored.

B. THE MULTITUDE OF REPORTS

The following is the minimum list of messages which must be sent in the right format to the required addressees in the designated time period allowed for reporting such an incident:

MOVEREP	To explain the delay in transit
PERS CASREPT	To report the injury of fireman Jones
CASREPT	To report failure of Number 3 boiler
CASREPT	To report failure of Number 2 generator
CASREPT	To report failure of the surface search radar
CASREPTS	To report the failure of each piece of communications equipment
COMSTAT	To report the change of status of communications equipment
FORSTAT	To report the change in material readiness of the ship
MILSTRIP	To order repair parts for the equipments reported by CASREPT
LOGREQ	To inform personnel at destination of the delay in arrival. A request for messages not received during the period in which the Fleet Broadcast could not be received.

There may be more messages required, but this list should serve to illustrate my points: one incident can create the requirement for a large number of messages.

In examining the content of the messages listed above, one can readily pick out a great number of redundant pieces of information which must be put into the proper format for transmission. Several of the messages are sent to the same addressees. For example, in the five (or more) CASREPTS, answers to the following appear: Can the ship continue its present mission; are repair parts onboard-allowed/ordered; what is the name and date of next port visit. In the section on parts needed to repair the item, complete supply data must be furnished as well as the date-time-group of any supply related messages resulting from the CASREPT. Information concerning

the next port visit is also contained in both the LOGREQ and in the MOVREP. There are more examples of redundancy which become readily apparent when the actual messages are written up and compared.

III. DEVELOPMENT OF REPORTS

Through the years, an elaborate system of reporting has been developed for units of the fleet. Each Commander, Bureau, Systems Command, and functional area of the Navy requires reports either periodically or as situations develop. As the size of the Navy increased and the command elements became separated from the support units, and the support units became more specialized, they separated into isolated units operating independently of each other. The number, complexity and frequency of required reports has steadily risen to the point where it is now virtually impossible for the Commanding Officer of a typical afloat unit to be aware of all the reports which he is responsible to originate in any given situation.

With the diversification of activities ashore, more detailed reports have been introduced to the fleet. Some are narrative, but more and more, the reports are being required in some type of standard format. These formats range from loosely defined data elements in simple alphabetical order, to a rigidly styled format in which every character and space in the report must be exact. The amount of time required to prepare some of these reports is considerable, and it is questionable as to whether or not the effort involved in preparing the report is justified by the amount of information contained in the report. The required number of reports containing redundant information has driven the reporting units and the communications stations to a condition of extreme inefficiency.

The time has come to examine the requirements of all Commanders and Supporting Activities in an effort to provide each with the necessary information to perform his functions efficiently. These basic requirements could then be molded into a Navy-wide Information System.

IV. RECENT EFFORTS TO REDUCE MESSAGE TRAFFIC

A. COMMANDER FIRST FLEET

In 1968, the staff of Commander First Fleet made an initial study of the reporting requirements for units assigned to the First Fleet. The concept of starting an information base containing all data reported by First Fleet units was considered. Little support for this concept was found. This concept laid dormant until Fleet Exercise (ROPEVAL 3-71) in September 1971 [1]. At this time units participating in the exercise were required to send specified data items to Commander First Fleet in order to build a data base, but normal reporting was also required of the units. The data was compiled by hand. The amount of data was impressive; however, no provisions had been made at this time to utilize or further distribute this data and thereby eliminate the parallel reporting by the operating units.

The operational units did express an interest in such a reporting system, provided it would eliminate the other required reports.

A second Fleet Exercise (COMPUTEX-72) was conducted in April 1972 [2]. At this time the COMPREP (message format developed for Commander First Fleet Composit Reporting System) was introduced to the participation units. The COMPREP is a formatted message, designed to enable the originators to report various situations or events in one simplified format. (See list of reports covered on page 14). In this exercise an attempt was made to utilize automatic data processing equipment to process the COMPREP by reformatting the information into the traditional reporting format and transmitting the information to the normal addressees. At the same time the elements of information were utilized to compile a data base

which could be queried by selected Commands for specific pieces/items or categories of information. The COMPREP was the only report transmitted by the participants in this Fleet Exercise. Normal, separate, operational reports were not originated and sent as had been done in the previous exercise ROPEVAL 3-71. The participating units were impressed by the reduction of traffic and the conciseness of this report. The major problems encountered during this exercise were attributable to inadequately written programs controlling the automatic data processing equipment located in Hawaii [2].

The programs' lack of tolerance of minor errors in the format, or of errors introduced during transmission required the reformatting of most of the regular operational reports by hand. The personnel operating the automatic data processing equipment were not properly indoctrinated on the correct procedures to follow when the automatic data processing equipment would not reformat a particular message correctly, and this resulted in an unacceptable time delay in the delivery of actual "operational traffic." The COMPREP reporting phase of this exercise had to be terminated early in the exercise to insure operational reports were in fact delivered on time. Once again, the Commanding Officers of the units involved in reporting by means of a COMPREP were enthusiastic.

B. HIGHER LEVELS OF INTEREST

In October 1972, a Command Information Workshop was convened in Washington, D.C. to generate interest in the development of a new reporting system, Navy Status of Forces (NSOF) [3]. This system would be incorporated as a subsystem of the World Wide Military Command and Control system (WWMCCS). This workshop marked the first time that operating personnel from the fleet as well as planning personnel from the office of

OPNAV combined forces to examine the possibility of a single formatted message replacing a variety of established reporting systems.

The recommendations forwarded from this workshop were the basis for Chief of Naval Operations message 301348Z November 1972. This message, addressed to various Commands, set forth a time table for development of a single formatted message based on Commander First Fleet's COMPREP, an earlier attempt to consolidate a variety of reports [4]. Upon receipt of this message, a preliminary development team was formed in San Diego, California, under the direction of OPNAV 943. This team was composed of personnel from the Naval Electronics Laboratory Command, San Diego; the staff of Commander First Fleet; and a civilian contractor familiar with communications systems.

This team began working on a proposal in December 1972. In January 1973, their proposal was presented to OPNAV 943 [5]. It was rejected on the basis of being too optimistic with respect to time tables set for; research and development; formulation of the format; writing and testing of software package; implementation. Another strong criticism of the proposal was the absence of a detailed cost analysis.

In the previously described Commander First Fleet attempts to evaluate a new reporting system, the following existing reports were to be replaced by the formatted message, COMPREP:

Aircraft Availability
Air Summary
Ammunition Expenditure
Broadcast Shift
Broadcast ZDK/ZFK Request
CASREPT
CASCOR
Communications Guard Shift
Communications Interference
COMSTAT
Contact
C & D Actions
Electronic Interference (MIJI)
Fuel Status
MILSTRIP Requisitions
MOVEREP
Operational Efficiency (NUDET)
OPREP-3 (Exercise)
OPSTAT
Position/PIM
Sitrept
Task Organization Changes
Termination Request
VP Mission Summary
VP Unit Tasking
Weather Observations
Oceanography Reports

These message formats were analyzed and broken down into basic elements of information. The basic elements of information were then organized into 18 different categories or sections. The sections were further divided into lines, with each line assigned a 5 letter code for automatic processing.

The latest proposal by the preliminary development group has organized the information into more general categories of a more narrative nature. The exact format had not been worked out due to non-availability of funding.

The concept of composite reporting is sound and exciting. It would provide all the information in a timely manner to all Operational and Administrative Commanders through a Navy-wide Information System. The areas which must still be developed are:

1. The list of all messages/reports to be incorporated into the system during the initial implementation.

2. A format must be developed which will lend itself to modification, i.e., addition of other reports, changes to present requirements or deletion of obsolete reports.

3. Development of a software program to process the new format, insure proper dissemination and feedback to the originating unit.

V. ADAPTABILITY

A mandatory feature of a Composite Report is that it be capable of adapting to change without the necessity of completely restructuring the report. This feature is important both for the development of initial phases of the report as well as for future growth of its usage.

Traditional message formats, such as the MOVEREP, apparently have been devised to concisely present exactly the data items desired by the reporting center. Such a format might be specified after a careful survey of needed information. Some appear to be specified so that the person composing the report can conform, character by character, to a computer program's strict input format. But modern computer software techniques are no longer strictly tied to the fixed character position analysis of punched card collating days. The consistency checking and free format styles allow a new case and a degree of forgiveness to the human composer.

For the exercises previously conducted by Commander First Fleet, it was reasonable to compose a single COMPREP format to replace a definite fixed list of traditional reports. However, for the introduction of the COMPREP system into Navy-wide use as described in the next section, it will be necessary to use a format which will accommodate other messages not listed as initial messages to be incorporated into the COMPREP system.

As evidence that the COMPREP concept is adaptable enough to allow inclusion of reports which were not specifically included in its design, the following discussion illustrates the expansion of Commander First Fleet's COMPREP format to include a standard SEARCH AND RESCUE report as required by NWIP 10-1 (D).

Figure 5.1 is a message, utilizing the COMPREP format developed by Commander First Fleet, which contains the information necessary to construct the following standard reports: POSITION, FUEL STATUS and WEATHER OBSERVATION. Figure 5.2 is a standard SEARCH AND RESCUE report.

The extension of the COMPREP containing the POSITION, FUEL and WEATHER OBSERVATION in Figure 5.1, to include all of the information in the SEARCH AND RESCUE report in Figure 5.2, is shown in Figure 5.3. Note that the only additional elements are items 22 through 26. The remainder of the information contained in the SEARCH AND RESCUE report was already present in the COMPREP illustrated in Figure 5.1 in data items 1,3,4,5, 7,9,10,11,15,16,18 and 19.

The number of characters required to transmit the SEARCH AND RESCUE report in the standard message format, Figure 5.2, is 296. If this message was integrated into the COMPREP as shown in Figure 5.3, it would take only 38 characters. This is a net savings in terms of characters transmitted of 258. Even if the SEARCH AND RESCUE report was the only message to be sent, Figure 5.4, the entire message would contain only 245 characters in the COMPREP System vice 296 in the standard format. Additionally, this COMPREP would automatically provide updates to the ship's position and present weather files.

An adaptable format such as this will confidently be expected to be capable of including most of the current operational reports. In addition, the COMPREP must be capable of changing with future reporting requirements to allow future evolution into a useful, efficient component, compatible with future information systems.

SAMPLE MESSAGE USING COMPREP FORMAT
DEVELOPED BY COMMANDER FIRST FLEET

From: USS SHIP
To: COMPREP PROCESSOR

Bt

Date Element Identity	CLASSIFICATION COMPREP			Explanation of data element
1	AAXXX	DD-999		Unit identification
2	ABXXX	003		Serial number of report
3	ACXXX	101643		Date time group of report
4	ADXXX	27-16		Latitude of unit
5	AEXXX	125-12	Position	Longitude of unit
6	AFXXX	090-10		Course and speed of unit
7	AHXXX	176.3.2		Task Unit Assignment of unit
8	BAXXX	68	Fuel	Percentage of burnable fuel onboard
9	KAXXX	B		Ship weather observation
10	KBXXX	4,3,16,08		Wind indicator, cloud coverage, wind direction, speed
11	KCXXX	98,02		Visibility, present weather
12	KDXXX	4		High cloud coverage
13	KEXXX	1,7		Type low clouds, height of cloud base
14	KFXXX	5,6	Weather	Type middle clouds, type high clouds
15	KGXXX	103,25		Barometric pressure, Air temperature
16	KHXXX	10,20,15.0		Air/sea temp differential, dewpoint, sea surface temp
17	KIXXX	2,10		Barometric tendency, barometric change
18	KKXXX	07,02		Seawaves: period, height
19	KLXXX	07,5,04		Swell: direction, period, height
20	KMXXX	1		Past weather
21	KNXXX	5,3		Course-speed, last three hours
	GP-4			
	BT			

FIGURE 5.1

STANDARD SEARCH AND RESCUE REPORT

191643Z JAN 73

FM USS SHIP

TO RESCUE COORDINATION CENTER
CTF 176
CTG 176.3

BT

CLASSIFICATION

SEARCH AND RESCUE 3130

A. NWIP 10-1 (D)

THE FOLLOWING IS SUBMITTED IAW REF A

1. 1DD

2. VIS 10, WIND 160/8, AIR TEMP 25C, SEA SURF TEMP 15C, WAVES: HT 02, PD 07, SWELL: DIR 07, HT 04, PD 05

3. CIRCULAR AREA, RADIUS 20 MILES FORM 27-16N, 125-12E

4. 63

5. YES

GP-4

BT

FIGURE 5.2

SAMPLE MESSAGE USING COMPREP FORMAT
DEVELOPED BY COMMANDER FIRST FLEET:
INCLUDES POSITION, FUEL, WEATHER, SEARCH AND RESCUE

From: USS SHIP
To: COMPREP PROCESSOR

Bt

Data Element Identity	CLASSIFICATION COMPREP		Explanation of data element
1	AAXXX	DD-999	Unit identification
2	ABXXX	003	Serial number of report
3	ACXXX	101643	Date time group of report
4	ADXXX	27-16	Latitude of unit
5	AEXXX	125-12	Longitude of unit
6	AFXXX	090-10	Course and speed of unit
7	AHXXX	176.3.2	Task Unit Assignment of unit
8	BAXXX	68	Percentage of burnable fuel onboard
9	KAXXX	B	Ship weather observation
10	KBXXX	4,3,16,08	Wind indicator, cloud coverage, wind direction, speed
11	KCXXX	98,02	Visibility, present weather
12	KDXXX	4	High cloud coverage
13	KEXXX	1,7	Type low clouds, height of clouds base
14	KFXXX	5,6	Type middle clouds, type high clouds
15	KGXXX	103,25	Barometric pressure, Air temperature
16	KHXXX	10,20,15.0	Air/sea temp differential, dewpoint, sea surface temp
17	KIXXX	2,10	Barometric tendency, barometric change
18	KKXXX	07,02	Seawaves: period, height
19	KLXXX	07,5,04	Swell: direction, period, height
20	KMXXX	1	Past weather
21	KNXXX	5,3	Course-speed, last three hours
22	YAXXX	1B	Number and type units
23	YBXXX	20	Radius of search in miles
24	YCXXX	160-14	Center of search area from present position
25	YDXXX	63	Probability of detection
26	YEXXX	A	Can continue search
	GP-4		
	BT		

FIGURE 5.3

SEARCH AND RESCUE REPORT IN COMPREP FORMAT

From: USS SHIP
To: COMPREP PROCESSOR

BT

Data Element Identity	CLASSIFICATION COMPREP		Explanation of data element
1	AAXXX	DD-999	Unit identification
2	ABXXX	003	Serial number of report
3	ACXXX	101643	Date time group of report
4	ADXXX	27-16	Latitude of unit
5	AEXXX	125-12	Longitude of unit
9	KAXXX	B	Ship weather observation
10	KBXXX	4,3,16,08	Wind indicator, cloud coverage, wind direction, wind speed
11	KCXXX	98,02	Visibility, present weather
15	KGXXX	103,25	Barometric pressure, Air temperature
16	KHXXX	10,20,15.0	Air/sea temp differential dewpoint, sea surface temp
18	KKXXX	07,02	Seawaves: period, height
19	KLXXX	07,5,04	Swell: direction, period, height
22	YAXXX	1B	Number and type units
23	YBXXX	20	Radius of search in miles
24	YCXXX	160-14	Center of search area from present position
25	YDXXX	63	Probability of detection
26	YEXXX	A	Can continue search

FIGURE 5.4

VI. DEVELOPMENT OF THE COMPOSITE REPORT

A. PROPOSED COMPREP SYSTEM

The results of the two attempts by Commander First Fleet to develop an alternative to the present reporting system are encouraging. Although a smoothly operating system was not achieved during the exercises evaluating these systems, an overall acceptance and approval of the concept was expressed by the participating units.

I submit that a COMPREP System is not only a feasible, but a necessary step toward the reduction of the number of operational reports required of operating units. The proposal, as outlined and explained in the following section, should be viewed as basic steps in streamlining our present reporting system. The proposed development consists of a series of clearly identifiable Phases, which systematically and gradually modify the present reporting system into a navy-wide information system. The cost of such a project and the time required to develop the format, software and hardware are not addressed in this paper, although milestones have been identified and achievement of each milestone is dependent only upon the availability of funding.

Present Communications System

Within the existing Communications System (see Figure 6.1) traditional message reports are received by a communications station from various originators via several modes of transmission. Upon receipt, a copy of each message is stored as received and a copy is transmitted to the action addressee and to each information addressee. The communications section serves as a distribution point for the incoming messages.

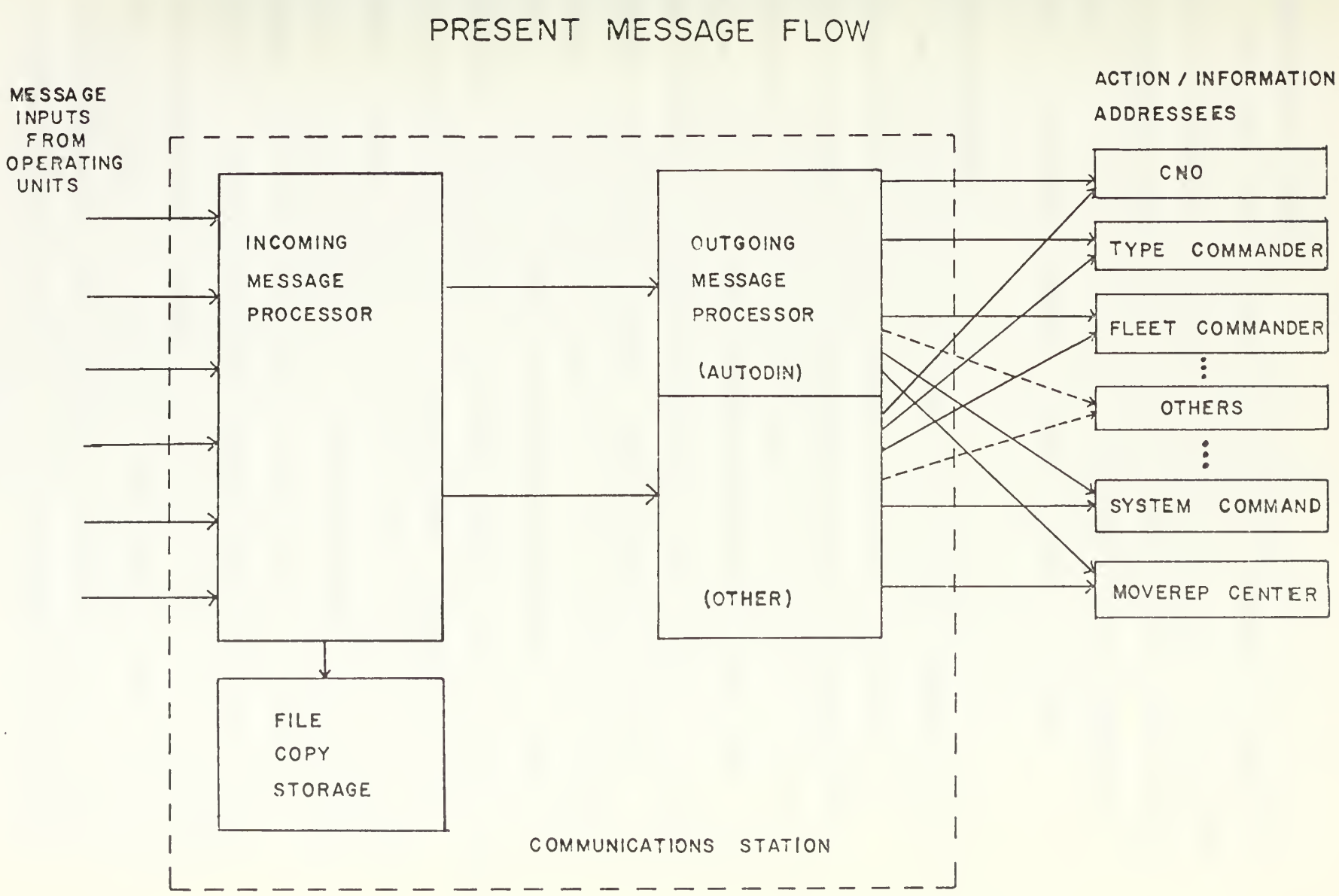
PRESENT MESSAGE FLOW
MESSAGE INPUTS FROM OPERATING UNITS
INCOMING MESSAGE PROCESSOR
FILE COPY STORAGE
OUTGOING MESSAGE PROCESSOR
(AUTODIN)
(OTHER)
COMMUNICATIONS STATION
ACTION / INFORMATION ADDRESSEES
CNO
TYPE COMMANDER
FLEET COMMANDER
OTHERS
SYSTEM COMMAND
MOVEREP CENTER

FIGURE 6.1

Research and Development

The research and development of a COMPREP System could be carried on with no interference to the present communications system. The research and development effort would be directed toward three main areas: Identification of reports to be initially incorporated into the COMPREP; the format of the COMPREP; software programs to process the COMPREP.

Test and Evaluation

Test and evaluation of the COMPREP System could be effected without interfering with the present communications system (see Figure 6.2). Figure 6.2 illustrates how sample COMPREPS, generated by hypothetical situations, would be sent to the evaluating unit through the communications station. The Incoming Message Processor would route these sample COMPREPS to a COMPREP Processor which would reformat the sample COMPREPS into traditional formats. The originators of the sample COMPREPS would also send the traditional reports required by the hypothetical situation, including the appropriate addressees, to the evaluation unit. The output from the COMPREP Processor would be compared with the traditional reports sent by the originator. Adjustments to the system, including changes to the COMPREP format, instructions for its use, the reformatting program, the accounting program and the addressee program, would then be made until the system proved to be operating correctly. (Reformatted messages, the same as the traditional reports, with the appropriate addressees, are obtained directly from the COMPREP Reformatting system.) At this point, representative operational units would be designated to begin submitting COMPREPS in addition to their traditional operational reports. It is acknowledged that during this

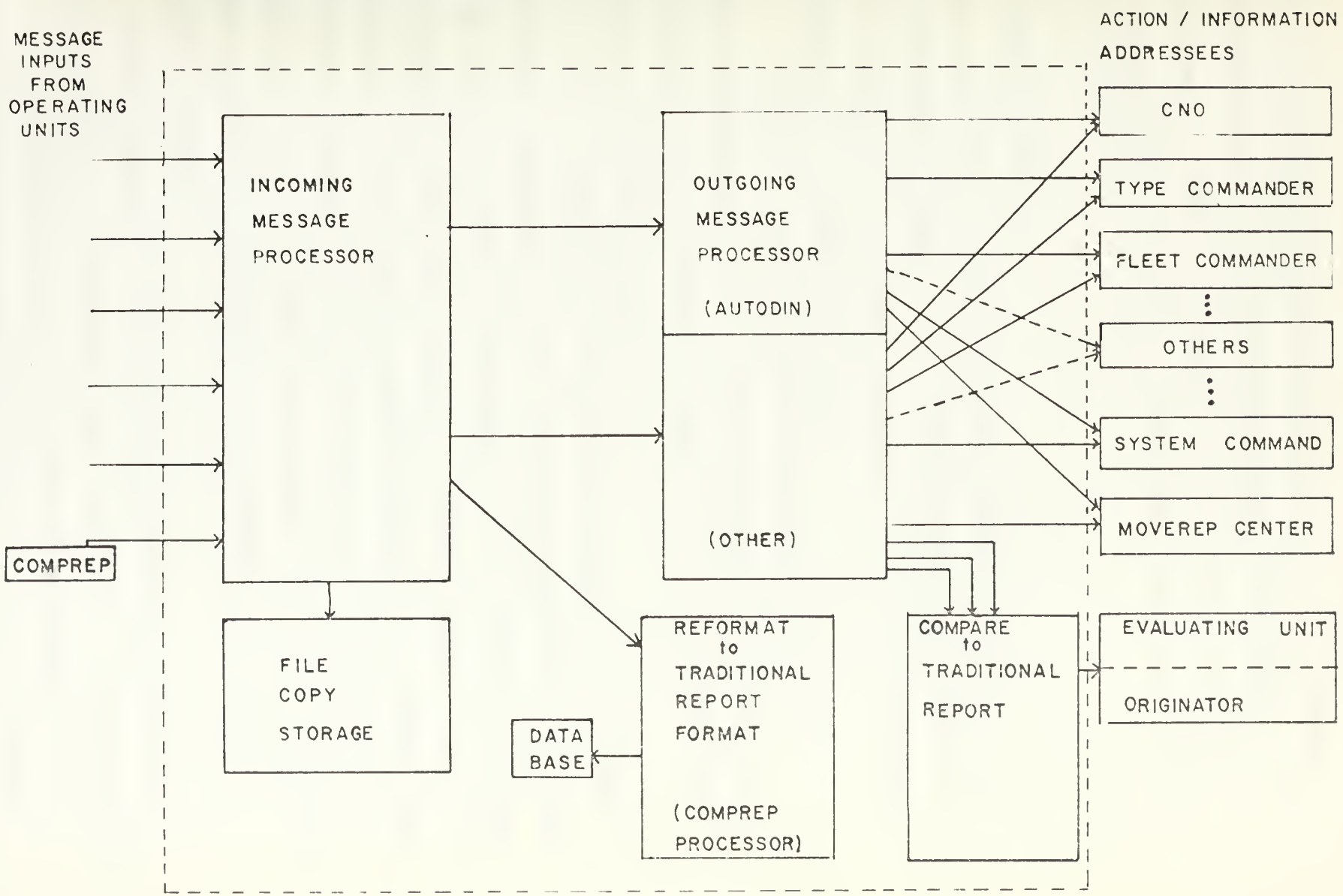
TEST & EVALUATION
MESSAGE INPUTS FROM OPERATING UNITS
ACTION / INFORMATION ADDRESSEES
INCOMING MESSAGE PROCESSOR
OUTGOING MESSAGE PROCESSOR
(AUTODIN)
(OTHER)
COMPREP
FILE COPY STORAGE
DATA BASE
REFORMAT to TRADITIONAL REPORT FORMAT
(COMPREP PROCESSOR)
COMPARE to TRADITIONAL REPORT
CNO
TYPE COMMANDER
FLEET COMMANDER
OTHERS
SYSTEM COMMAND
MOVEREP CENTER
EVALUATING UNIT
ORIGINATOR

FIGURE 6.2

portion of the Test and Evaluation Phase there would be an increase in both the workload and the volume of traffic being generated by the designated units. However, this period of time would be relatively short, involve only a small number of units, and be eliminated at the start of Phase I.

B. CRITERIA FOR SUCCESS

The objective of the Test and Evaluation Phase of the COMPREP System is to determine if the system can successfully perform the functions for which it was designed. In order to be deemed a success, the system must be capable of, as a minimum, the following:

1. It must work! When a COMPREP is originated correctly and received by the communications station, the accounting and reformatting function must correctly process the COMPREP and deliver the traditional message to the correct addressees.

2. The time elapsed from the time of the incident until the time that the action addressees have the reformatted messages must be the same as, or less than, the time it would take for action addressees to receive the traditional reports under the present reporting system. That is, the total time required to prepare, transmit, and reformat the COMPREP, plus the time to transmit the reformatted message to the addressees must be equal to, or less than the time it would require to prepare, transmit and effect delivery of the traditional reports generated by a particular incident or situation.

3. The preparation of the COMPREP by the originator must be easier than the preparation of required reports generated by a specific incident.

4. The originators and the addressees must be convinced that the COMPREP system is an improvement over the existing reporting system.

5. The actual transmission time from ship to shore must be less utilizing the COMPREP than it would be transmisting the traditional messages.

C. THE COMPREP PROCESSOR

Traditional message traffic passing through a communications station will not be affected by the integration of a COMPREP Processor into the system, as illustrated in Figure 6.2. These messages will be handled in accordance with existing practices.

The COMPREP will be diverted to the COMPREP Processor. Figure 6.3 diagrams the flow of information through the COMPREP Processor. Upon entry into the COMPREP Processor, several subroutines will act on the message. In the area of accounting, records will be maintained of each unit by Unit Identification Code and serial number of the COMPREP. By utilizing a scheme in which the serial number of the COMPREP received is compared to the serial numbers of COMPREPS of individual units already processed, missing and redundant reports can be detected. As a result, a report of missing numbers would automatically be generated and sent to the originator. Another feature of the accounting system is automatic generation of requests for additional reports if a predetermined maximum time between reports has been exceeded.

While the accounting functions are being performed, the message is passed to the reformatting section. There the message is broken down into data elements. Using the Unit Identification Code, data elements to establish the type of report, Task Organization and geographical location, appropriate action and information addressees are assigned. The types of reports required are determined and the data elements are reformatted

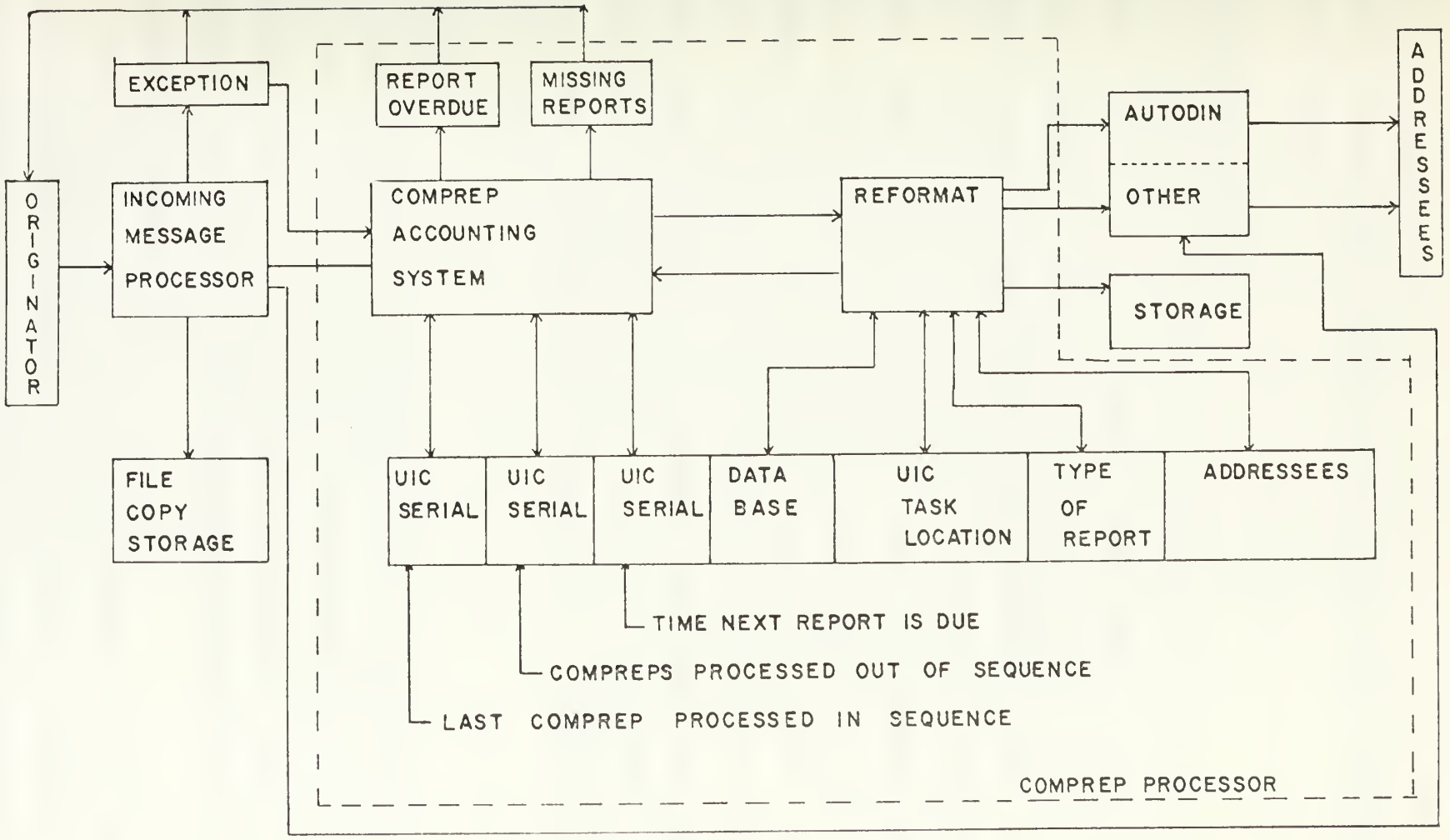

FIGURE 6.3

FLOW OF INFORMATION THROUGH COMPREP PROCESSOR

into the traditional report form. The traditional report is then transmitted to the addressees through existing channels and a record copy is placed in storage.

Implementation of Phase I

Upon completion of the Test and Evaluation Phase, assuming that the system is evaluated as being successful, the transition into Phase I could be accomplished smoothly. The COMPREP Processor, already in a position to receive inputs from the Incoming Message Processor (see Figure 6.2) could easily be integrated into the present communications system (see Figure 6.4). At this time, those units which have participated in the Test and Evaluation Phase would commence submitting COMPREPS in lieu of traditional reports. Other units, after a specified period of dual reporting, would gradually be changed over to the COMPREP System, until the COMPREP became navy-wide. Note that this gradual changeover can proceed at any rate. An individual unit would be added to the system upon demonstrating its capability to utilize the COMPREP format correctly.

Phase II

As an intermediate step in progress toward a large information system, Phase II would permit changes advantageous to users, i.e., the commands maintaining data bases or files of information. Figure 6.5 illustrates how the user receives information at the present time, and two possible advanced forms.

As the situation exists now, and during Phase I, all users would receive "traditional messages" in existing format. The individual user would continue to process these messages and update his own files.

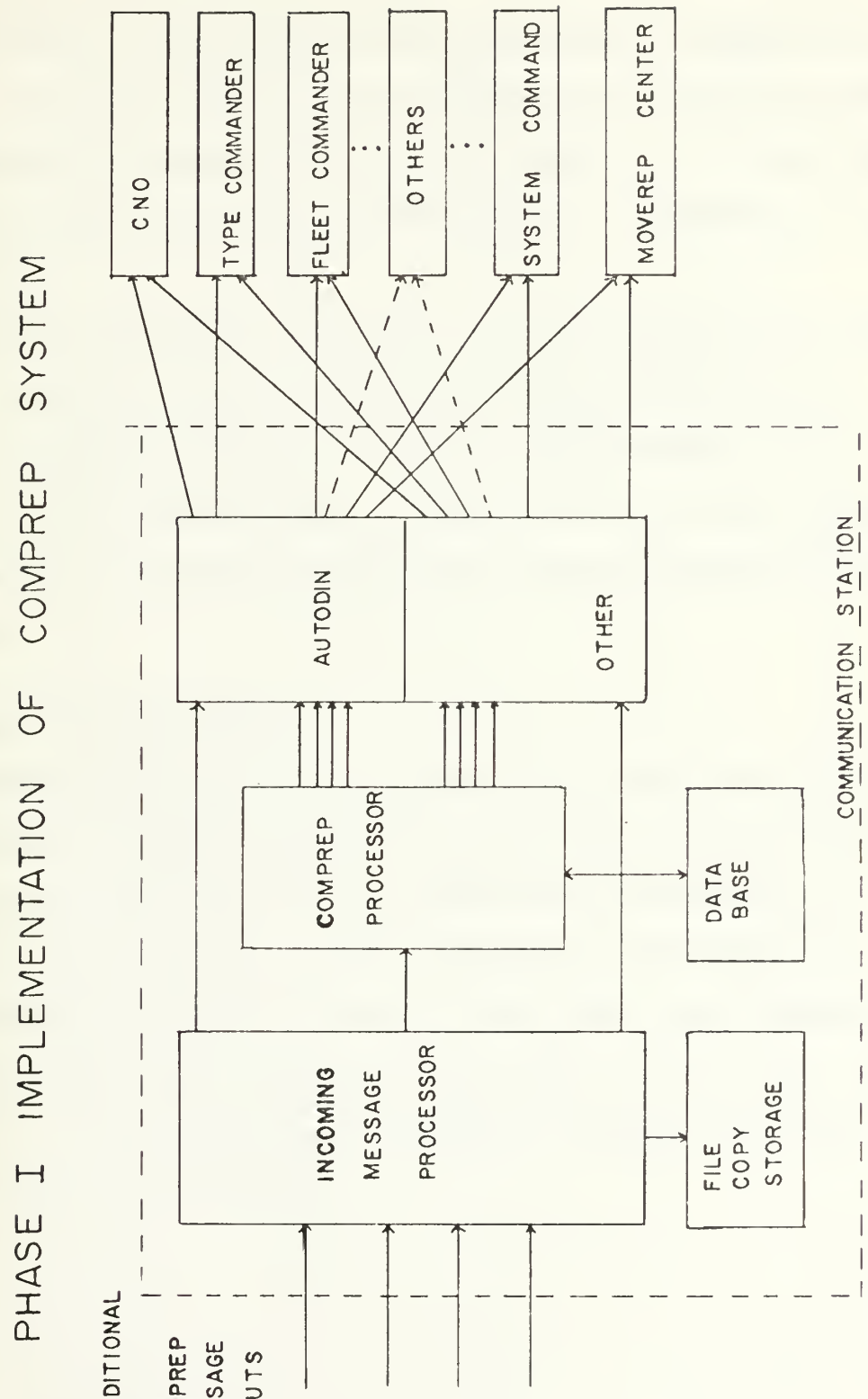
PHASE I IMPLEMENTATION OF COMPREP SYSTEM
CNO
TYPE COMMANDER
FLEET COMMANDER
OTHERS
SYSTEM COMMAND
MOVEREP CENTER
AUTODIN
OTHER
COMPREP PROCESSOR
DATA BASE
INCOMING MESSAGE PROCESSOR
FILE COPY STORAGE
COMMUNICATION STATION
TRADITIONAL AND COMPREP MESSAGE INPUTS

FIGURE 6.4

In Phase II, should the user determine that certain data were no longer necessary or that additional data were needed, the change could be made to the format which he receives without the expense and the time delays required in implementing a navy-wide change to an existing report. The change would be made in the COMPREP Processor ("modification I" of Figure 6.5).

A further modification, and perhaps the most beneficial to the user, would be a direct link from the COMPREP Processor, through existing channels, to the users computer or data base ("modification II" of Figure 6.5). This would eliminate at least one stage of human handling of the message, and provide the user with up-to-date information at any given time.

Long Range Information System

At present the trend in reporting seems to be toward a vast information system. Although the design of such a system is beyond the scope of this paper, the evolution of the COMPREP System through Phase II, particularly the computer-to-computer link form of "modification II" described above, is fully compatible with this trend. Any information system now within sight could accept message inputs in this form. (See Figure 6.6.) Some systems might even view the COMPREP System as an integral part of their network.

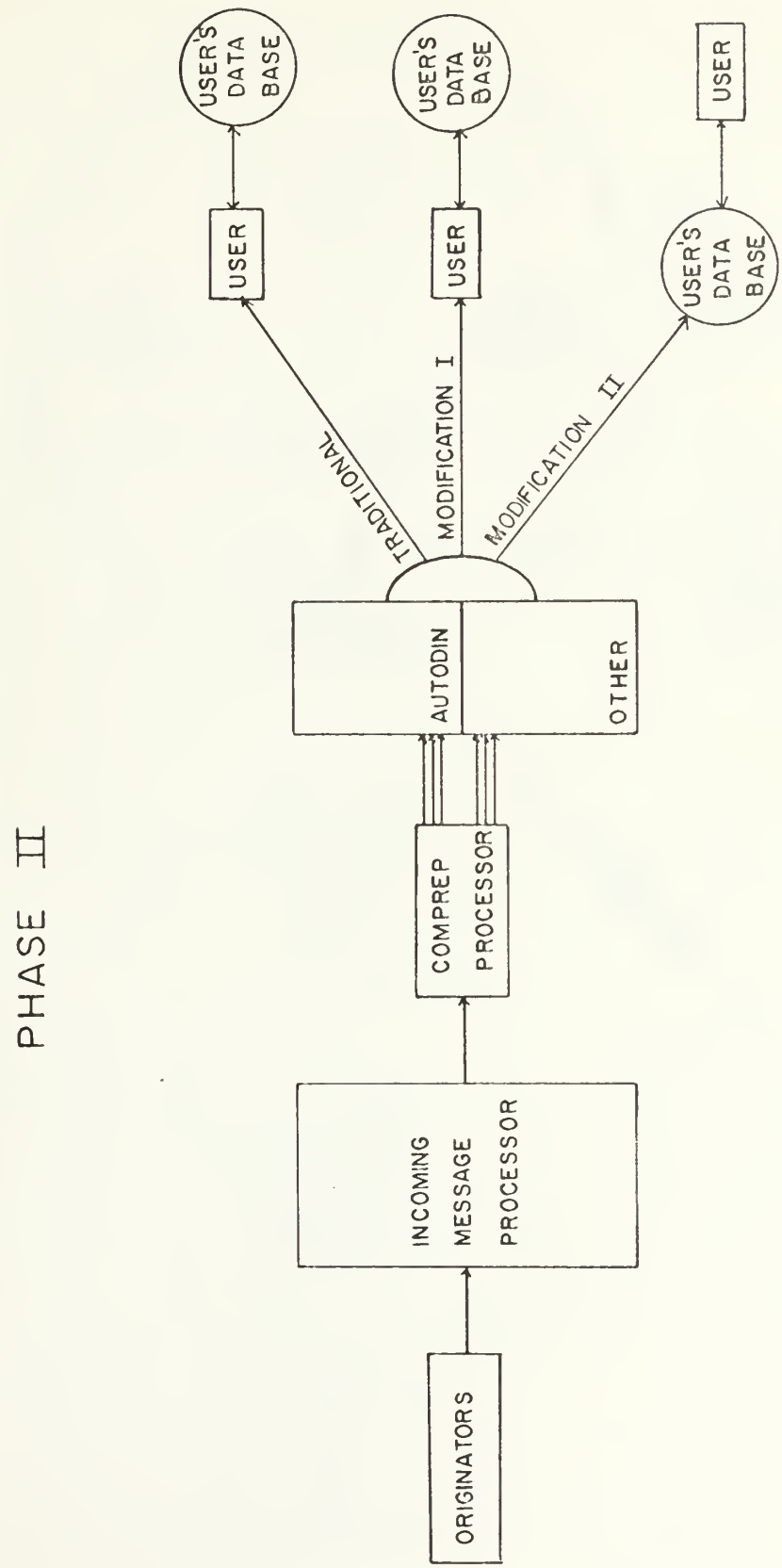
PHASE II
ORIGINATORS
INCOMING MESSAGE PROCESSOR
COMPREP PROCESSOR
AUTODIN
OTHER
TRADITIONAL
MODIFICATION I
MODIFICATION II
USER
USER
USER
USER'S DATA BASE
USER'S DATA BASE
USER'S DATA BASE

FIGURE 6.5

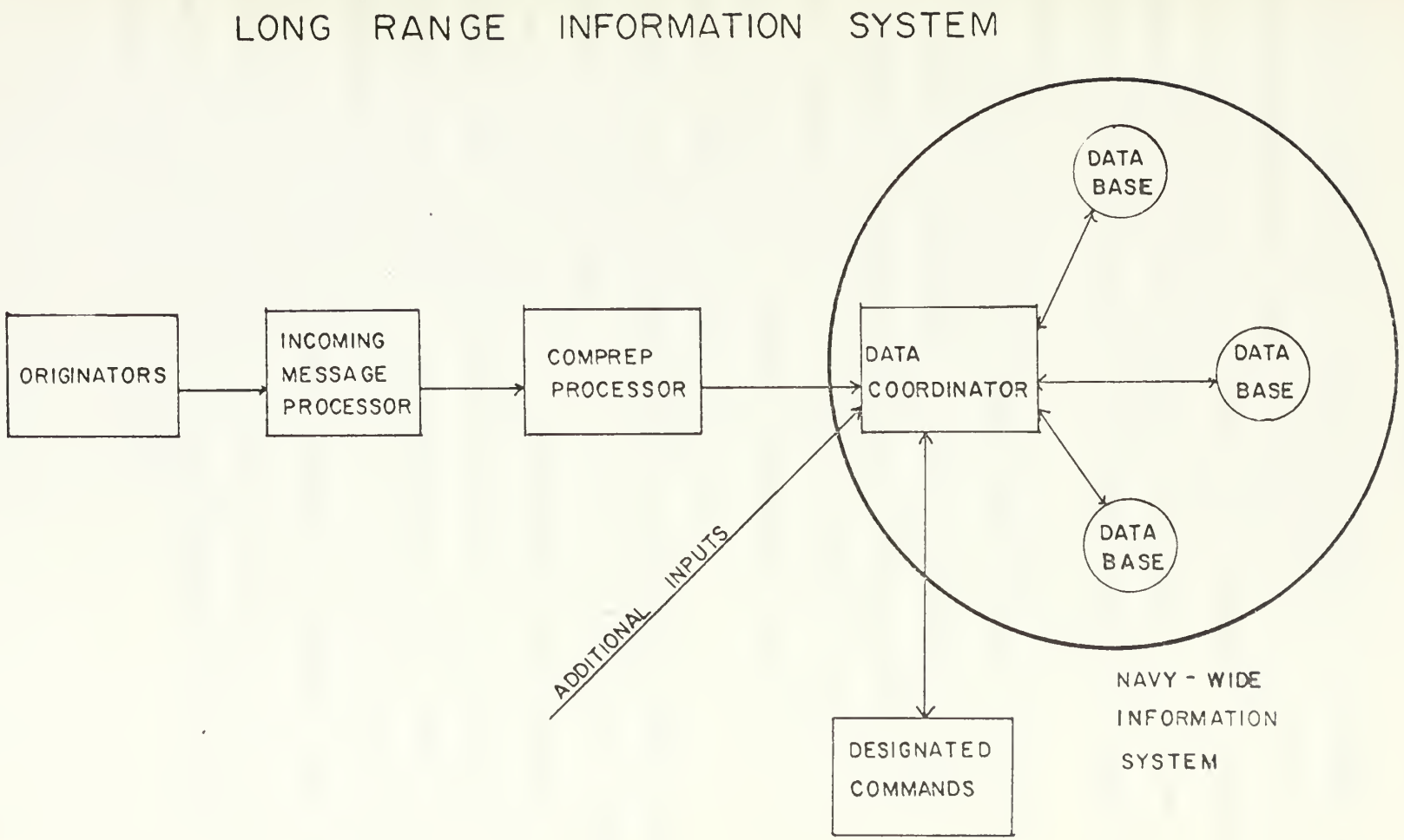
LONG RANGE INFORMATION SYSTEM
ORIGINATORS
INCOMING MESSAGE PROCESSOR
COMPREP PROCESSOR
DATA COORDINATOR
DATA BASE
DATA BASE
DATA BASE
ADDITIONAL INPUTS
DESIGNATED COMMANDS
NAVY - WIDE INFORMATION SYSTEM

FIGURE 6.6

VII. SUMMARY

Personnel responsible for meeting the reporting requirements imposed on operational units of the fleet are faced with an enormous task. The number of types and complexity of the reports required have increased to the point where it is almost impossible to be aware of and to meet these requirements with a high degree of confidence that all the requirements have been met.

Recent attempts to alleviate this problem have been made by Commander First Fleet with the development of a composite reporting system, COMPREP. While evaluating the COMPREP during Fleet Exercises ROPEVAL 3-71 and COMPUTEX-72, many problems in the area of automatic processing were uncovered. Nevertheless, Commanding Officers of the afloat units involved endorsed the concept of Composite Reporting.

In support of the Composite Reporting concept as a means to streamline the present reporting system, a plan for the development of a COMPREP System was presented. Some of the shortcomings of the previously developed systems were noted. The most important areas in the development of the COMPREP System were defined. The capability of such a system for expansion was illustrated through the addition of a previously excluded report, SEARCH AND RESCUE, into the format developed by Commander First Fleet. This illustration shows that by utilizing the Composite Reporting format, the amount of preparation time and more importantly the amount of transmission time saved is considerable.

The proposal for a Navy-wide Composite Reporting System in Section VI describes, step by step, a reasonable method of developing such a system, and explicit performance specifications to be met to insure success. In addition, the system is described as it might be modified in the future to become an integral element in the realization of a Navy-wide Information System.

APPENDIX I

Summary of Proposal presented by the Preliminary Development Team sponsored by OPNAV 943.

PRIMARY OBJECTIVES

To reduce fleet unit reports

To simplify message drafting

To afford man and machine readibility

To reduce message traffic throughout the navy

To improve message timeliness

To provide feedback to fleet units

SECONDARY OBJECTIVES

To minimize information redundancy

To simplify operator message preparation

To reduce total circuit transmission time

To provide recipient more complete operational information

To improve information quality

LONG-RANGE OBJECTIVES

To increase Command and Control Communications effectiveness

To incorporate other recurring message reports

To provide Navy-wide access to operational and Readiness information

To support Readiness and Training Management

The COMPREP as proposed by the preliminary development team would be implemented in three phases, each phase being a logical follow-on to the already existing system. The time frame for progressing from one phase to the next was not specifically defined, but would depend upon the

performance, workability and funding available. It was proposed, however, that the basic design, distribution of materials and implementation of Phase I could be accomplished by July 1974.

In order to more clearly illustrate the three phases envisioned in implementing the COMPREP, the affect of each phase is shown on each of the three major components of the system in the following table:

	I	II	III
REPORTING UNIT	Single ship to shore message	Single ship to shore message	Single ship to shore message
COMPREP CENTER	Translate information for distribution into existing message format.	Reformat and distribute the information in user specified message format.	Compile a queriable information base and transmit subsets of information directly to the users information system.
USER ACTIVITY	Receive customary message traffic.	Receive information in own specified format.	Receive direct updates to own information base, periodic summary reports and real-time query respon s.

APPENDIX II

The following data was collected as a result of COMPUTEX 10A-72. The Composite reporting was done in a 10 day period with 44 participating afloat units sending 601 COMPREPS to the COMPREP CENTER established by Commander First Fleet (CTF 170). The breakdown of outgoing messages generated by the COMPREPS as classified by type were:

Narrative	126	CASREPT	33
OPSTAT	79	MOVREP	25
MILSTRIP	63	BATHY	24
Weather	59	SST	12
COMSTAT	52	ZDK/ZFK	11
CASCOR	49	Termination	3
Sitrep	46	Broadcast Shift	1
Guard Shift	35		

The total number of operational messages reformatted and transmitted from the 601 COMPREP input messages was 618. Although this may seem like an insignificant difference in terms of actual messages, the following two points should be considered.

1. There was only one format, a prepositioned, "fill in the blanks" format, which required no research by the originator. All of the information and instructions for completing the report were contained on the message blank.

2. The messages were addressed only to CTF 170, CTU 170.1.9 and to immediate operational Commander of the reporting unit, instead of a long series of AIG's and other "concerned commands."

REFERENCES

1. Commander First Fleet Composite Reporting System, Serial 123, 10 March 1972.

2. Commander First Fleet Composite Reporting System, undated.

3. CNO message 152236Z September 1972, Navy Status of Forces (NSOF), Information System Specifications and Design Workshop, Convening of.

4. CNO message 301348Z November 1972, Navy Operating Unit Composite Reporting.

5. COMPREP Proposal, OPNAV 943 Study Group, January 1973.

6. CNO Letter Serial 2519P943, 20 November 1972, NSOF, Sub-system of WWMCCS; Development of.

7. Commander Cruiser Destroyer Forces Pacific Instruction 5000.3E, 15 February 1972.

8. NWIP 10-1 (D).

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ABSTRACT

The problems encountered by operational units of the U.S. Navy in meeting the requirements to submit a multitude of reports ranging from simple Fuel Status Reports to rigidly defined, computer formatted Movement Reports are almost overwhelming. The evolution of these requirements and recent attempts to simplify reporting are reviewed. A proposal is presented which outlines the development, test, and evaluation, and a gradual integration of a Composite Reporting System into the existing communications system. This Composite Reporting System is the logical predecessor of a Navy-wide Information System

KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
CompositeReport						
Comprep						
Message Traffic Reduction						
Navy-wide Information System						

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